

STANDARD CHLORINE OF DELAWARE, INC.

GOVERNOR LEA ROAD • P.O BOX 319 • DELAWARE CITY, DELAWARE 19706

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October 21, 1988

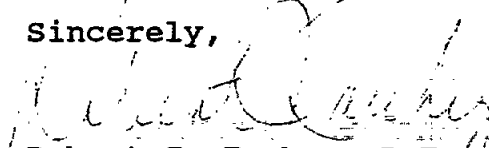
Ms. Diane Wehner
Environmental Scientist
DNREC
715 Grantham Lane
New Castle, DE 19720

Dear Ms. Wehner:

In accordance with paragraph 6 of the Consent Order between Standard Chlorine of Delaware, Inc. and the Delaware Department of Natural Resources and Environmental Control, we are hereby submitting the third Quarterly Groundwater Monitoring Report.

Please feel free to contact me if you have any questions.

Sincerely,


Robert J. Touhey, P.E.
Assistant Vice President
Environmental Affairs

RJT/mbg

Enclosures

cc: A. R. Sinibaldi
T. E. Pierson
B. V. Bowers

AR307726

QUARTERLY MONITORING REPORT
GROUND WATER RECOVERY OPERATIONS

STANDARD CHLORINE OF DELAWARE, INC.
DELAWARE CITY, DELAWARE

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21 October 1988

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GROUND WATER RECOVERY OPERATIONS

STANDARD CHLORINE OF DELAWARE, INC.
DELAWARE CITY, DELAWARE

In response to the 22 January 1988 Consent Order between the Delaware Department of Natural Resources and Environmental Control (DNREC) and Standard Chlorine of Delaware, Inc., this quarterly report has been prepared to document monthly withdrawal rates and contaminant recovery at the pumping wells; and quarterly sampling results and water level data for the recovery and monitor wells. The report also contains an evaluation of the effectiveness of the recovery system and recommendations to improve the system. Documentation presented in this report covers the quarterly period from July to September 1988.

EVALUATION OF THE RECOVERY SYSTEM

The average monthly withdrawal rates from recovery wells RW-1 through RW-4 are presented in Table 1. Recovery wells RW-1 and RW-4 pumped continuously for the majority of the quarter except for a 12 day period in July when the plant was shut-down. Withdrawal rates at RW-1 and RW-4 ranged between approximately 4.4 and 5.6 gpm which is generally consistent with historical pumping rates. Although new flow meters were installed at each recovery well in response to last quarter's recommendations, the flow meter at RW-2 encountered operational problems. However, recovery RW-2 was pumping for the majority of the quarter. The pump in recovery well RW-3 was inoperable during the quarter due to mechanical problems. This pumping system is presently under repair.

Ground water level data collected at the recovery and monitoring wells on 15 September 1988 were used to construct a water level contour map presented in Figure 1. This map represents actual water levels observed while the recovery wells were pumping. A complete summary of this water level data is presented in Table 2. The September 1988 contour map is nearly identical to last quarter's water table contour map. Overall the ground water recovery system appears to provide an adequate hydrogeologic barrier to contaminant migration, especially in the area of recovery

wells RW-1 and RW-2. The activation of recovery well RW-3 should enhance the ground water contaminant recovery along this portion of the system.

Monthly concentrations of organics recovered at RW-1, RW-2 and RW-4 are presented in Table 3. This data indicates that total organic concentrations recovered at the pumping wells are generally in the range of contaminant concentrations reported from last quarter. The highest contaminant concentrations were observed at RW-2. This recovery well showed monthly concentrations of total benzene species ranging from approximately 187 to 236 ppm. At RW-1 and RW-4, total benzene species concentrations for this quarter ranged between 47 and 82 ppm.

A comparison of the September 1988 isoconcentration map of the total benzene species (Figure 2) with last quarter's analytical data indicates that total contaminant concentrations in the ground water have generally remained the same.

RECOMMENDATIONS

1. Continue to investigate the feasibility of installing a submersible pump in the area of well TW-6A and pumping the extracted water to the air stripper. It should be noted that attempts have been made to install a pump in TW-6A. However subsurface damage to well TW-6A (i.e. bent casing) has prohibited the emplacement of a pumping system in this well. The feasibility of repairing well TW-6A is being investigated. If repairs cannot be made to TW-6A, adjacent monitor wells will be evaluated with respect to their use as a recovery well.
2. The pump system at RW-3 should be repaired or replaced as needed to increase the effectiveness of the contaminant recovery program. The flow meter at RW-2 should be repaired.
3. Continue the periodic well rehabilitation program to maintain steady pumping at the recovery wells.

TABLE 1

AVERAGE MONTHLY WITHDRAWAL RATES (GPM)/NUMBER OF DAYS
USED IN CALCULATING RATES
GROUNDWATER RECOVERY WELL SYSTEMS

STANDARD CHLORINE OF DELAWARE, INC.

<u>MONTH (1988)</u>	<u>RW-1</u>	<u>RW-2</u>	<u>RW-3</u>	<u>RW-4</u>
July	5.3/18 PD = 12 days	* 18 days PD = 12 days	PD = 31 days	4.7/18 PD = 12 days
August	4.8/31	0.4/17 * 14 days	PD = 31 days.	4.7/31
September	4.4/30	0.2/1 * 29 days	PD = 30 days	5.6/30

PD - pump down

* Days well is operational, but flow meter malfunctioning.

TABLE 2

GROUNDWATER LEVEL DATA
STANDARD CHLORINE OF DELAWARE, INC.
15 SEPTEMBER 1988

<u>Location</u>	<u>Measuring Point Elevation (Ft. MSL)</u>	<u>Depth to Water (Ft.)</u>	<u>Groundwater Elevation (Ft. MSL)</u>
TW-1	49.90	30.25	19.65
TW-2	56.10	40.17	15.93
TW-3	56.30	40.83	15.47
TW-4	55.00	40.67	14.33
TW-5	50.10	34.25	15.85
TW-6	50.70	35.50	15.20
TW-7	50.40	35.40	15.00
TW-8	52.20	38.08	14.12
TW-10	50.50	38.00	12.50
TW-22	51.62	38.83	12.79
TW-24	49.44	39.08	10.36
TW-25	49.44	36.83	12.61
TW-28	52.82	42.25	10.57
TW-30	52.29	40.42	11.87
TW-31	50.36	37.33	13.03
TW-49	55.71	48.5	7.21
TW-50	53.28	46.92	6.36
RW-1	54.75	48.25	6.50
RW-2	52.99	63.25	-10.26
RW-3	45.55	37.58	7.97
RW-4	48.08	40.75	7.33

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TABLE 3

MONTHLY CONCENTRATIONS OF TOTAL BENZENE SPECIES (ppm)
GROUNDWATER RECOVERY WELLS

STANDARD CHLORINE OF DELAWARE, INC.

<u>MONTH (1988)</u>	<u>RW-1</u>	<u>RW-2</u>	<u>RW-3</u>	<u>RW-4</u>
July	81.30	209.98	*	47.95
August	65.40	186.82	*	77.69
September	62.55	235.63	*	64.60

* No samples collected - Pump Inoperable

TABLE 4

QUARTERLY SAMPLING RESULTS
MONITOR AND RECOVERY WELLS

STANDARD CHLORINE OF DELAWARE, INC.

15 SEPTEMBER 1988

<u>Location</u>	<u>Total Benzene Species Concentrations (PPm)</u>
TW-1	10.49
TW-2	0.90
TW-3	1.14
TW-4	0.61
TW-5	243.45
TW-6	175.46
TW-7	22.45
TW-8	252.63
TW-10	112.13
TW-22	2.71
TW-24	43.84
TW-25	75.89
TW-28	245.56
TW-30	*
TW-31	201.26
TW-49	347.35
TW-50	260.91
RW-1	68.52
RW-2	238.13
RW-3	**
RW-4	64.29

* TW-30 has free organics.

** No samples collected - pump inoperable

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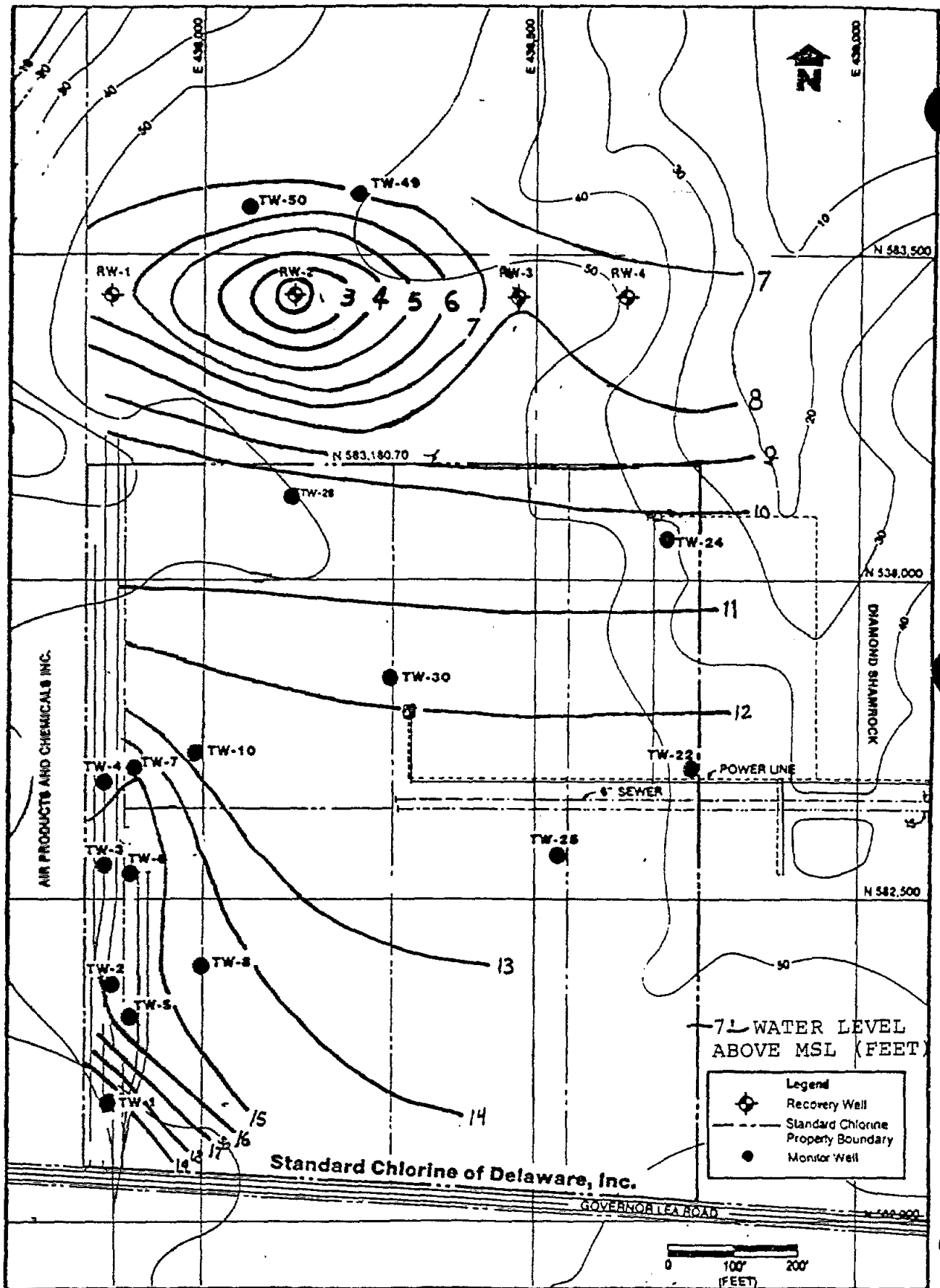


FIGURE 1: WATER LEVEL CONTOUR MAP
AS OF SEPTEMBER 1988

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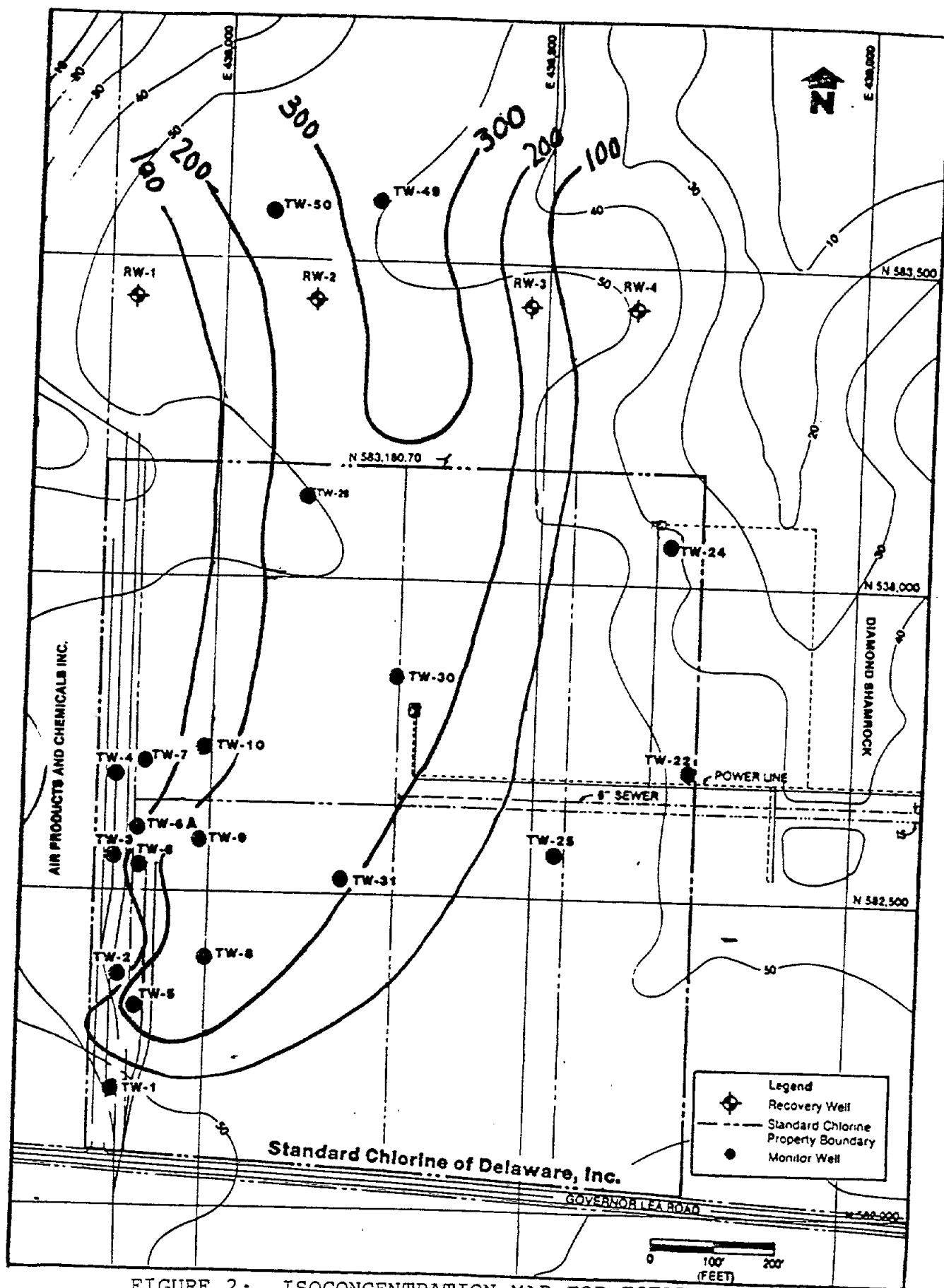


FIGURE 2: ISOCONCENTRATION MAP FOR TOTAL BENZENE SPECIES AS OF SEPTEMBER 1988. AR307735